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REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION
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DTIC FILE COPY

AD-A211 767

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R(S)

3. DISTRIBUTION/AVAILABILITY OF REPORT

Approved for public release; distribution is unlimited.

5. MONITORING ORGANIZATION REPORT NUMBER

6a. NAME OF PERFORMING ORGANIZATION

Naval Ocean Systems Center

6b. OFFICE SYMBOL
(if applicable)
NOSC

7a. NAME OF MONITORING ORGANIZATION

6c. ADDRESS (City, State and ZIP Code)

San Diego, CA 92152-5000

7b. ADDRESS (City, State and ZIP Code)

8a. NAME OF FUNDING/SPONSORING ORGANIZATION

Office of Naval Technology

8b. OFFICE SYMBOL
(if applicable)
ONT

9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER

8c. ADDRESS (City, State and ZIP Code)

Office of Chief of Naval Research
Arlington, VA 22217

10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO.

0602234N

PROJECT NO.

CDB8

TASK NO.

RS34
H20AGENCY
ACCESSION NO.

DN309 119

11. TITLE (include Security Classification)

COMPARING CONDITIONAL PROBABILITY MATRICES

12. PERSONAL AUTHOR(S)

D. E. Bamber

13a. TYPE OF REPORT

Professional Paper

13b. TIME COVERED

FROM

TO

14. DATE OF REPORT (Year, Month, Day)

August 1989

15. PAGE COUNT

16. SUPPLEMENTARY NOTATION

17. COSATI CODES

FIELD

GROUP

SUB-GROUP

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

man-machine interface & ASW

decision support, decision making, decision aids

operator functions

teleoperation

supervisory control

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

In a wide variety of tasks, a person's performance may be characterized by a conditional probability matrix having one row for each possible stimulus, one column for each possible response, and with each cell entry being a conditional probability of the form P(response/stimulus). This paper describes a method for measuring how close one person's conditional probability matrix is either to another person's matrix, to the person's own matrix in another condition, or to the matrix predicted by a model.

We describe a method for defining an inner product on the space of all SxR matrices. The inner product of two persons' conditional probability matrices measures their trial-by-trial response agreement. This inner product induces a distance metric on the space of all SxR matrices. We then describe a method for empirically estimating the inner product of two persons' matrices. From inner-product estimates, a distance estimate may be calculated.

Surprisingly, this technique is practical even in tasks where the number of stimuli is very large. We present an example of a task where the stimuli are sampled from a population of approximately 10^{240} potential stimuli. Thus, a person's conditional probability matrix has approximately 10^{240} rows and, consequently, it is infeasible to empirically estimate every conditional probability contained in a person's matrix. Nevertheless, it is quite feasible to empirically estimate the distance between the conditional probability matrices of two persons.

We have used the technique to study people's integration of multiple pieces of information in signal detection tasks.

Published in the *Journal of Mathematical Psychology*, August 1989.

89 8 29 071

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21. ABSTRACT SECURITY CLASSIFICATION

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**Call for Papers for the
Twenty-Second Annual Meeting of
The Society for Mathematical Psychology**

University of California, Irvine

August 3-5, 1989

The Twenty-Second Annual Mathematical Psychology Meeting will be held at the University of California, Irvine, August 3-5, 1989. The program committee is composed of William Batchelder, Tarow Indow, Geoffrey Iverson, R. Duncan Luce, Louis Narens, and John I. Yellott, Jr.

Papers may be submitted by regular members, student members, and non-members. Any one person may present only one paper but may be a coauthor of other papers, or may be an invited speaker or symposium participant. Papers will be limited to those in which mathematical, statistical, and simulation methods play a significant role in the development of psychological ideas or in the interpretation of results. Purely theoretical developments should clearly relate to some psychological issue or contribute to methodologies of obvious use in psychology. Experimental results should bear directly on some mathematical or simulation model.

Program of past meetings appear in the Journal of Mathematical Psychology and may be consulted for ideas concerning symposia as well as for ideas about areas that have not recently been covered. All society members are welcome to make suggestions for symposia and invited speakers as soon as possible to the program committee. Abstracts of papers to be presented at this meeting must be received by **April 24, 1989**.

Papers to be read at the meeting are accepted on the basis of their quality and suitability and not according to the author's affiliation with the Society. Presentation time for each paper will be limited to 25 minutes including 5 minutes for discussion. Paper sessions will be strictly timed. When submitting a paper, an author should include the following on a single sheet of paper:

1. Name(s) and institutional affiliation(s) of author(s)
2. Membership status in the Society (member, student member, or nonmember)
3. Title of the paper (less than 72 characters including spaces)
4. Category of the paper. Choose the most appropriate from the following list: (a) physiology including connectionist modeling, (b) psychophysics, (c) sensation and perception, (d) measurement and scaling, (e) learning and memory, (f) information processing and performance, (g) judgment, decision, and choice, (h) cognition and language, (i) social psychology, (j) methodology and statistics, or (k) other (e.g. signal detection, artificial intelligence).
5. An abstract of no more than 250 words.

Abstracts, symposium outlines, suggestions for invited speakers, and questions regarding local arrangements should be addressed to:

William H. Batchelder
School of Social Sciences
University of California
Irvine, California 92717

Specific information regarding travel and accommodations will be sent in late spring to members of the Society for Mathematical Psychology; others should contact:

Dee Yox
School of Social Sciences
University of California
Irvine, California 92717
Telephone: (714) 856-6336

Remember: Abstracts must be received by April 24, 1989.

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Title: Comparing Conditional Probability Matrices

Category: Methodology & Statistics

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DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Avail and/or	
Dist. Statement	
A-1	

**Abstract**

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We describe a method for defining an inner product on the space of all $S \times R$ matrices. The inner product of two persons' conditional probability matrices measures their trial-by-trial response agreement. This inner product induces a distance metric on the space of all $S \times R$ matrices. We then describe a method for empirically estimating the inner product of two persons' matrices. From inner-product estimates, a distance estimate may be calculated.

Surprisingly, this technique is practical even in tasks where the number of stimuli is very large. We present an example of a task where the stimuli are sampled from a population of approximately 10^{240} potential stimuli. Thus, a person's conditional probability matrix has approximately 10^{240} rows and, consequently, it is infeasible to empirically estimate every conditional probability contained in a person's matrix. Nevertheless, it is quite feasible to empirically estimate the distance between the conditional probability matrices of two persons.

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Requested Time: 25 minutes (including 5-minute discussion)